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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
|-----------------|-------------|----------------------|---------------------|
| 09/357,264 | 07/19/99 | ZHANG | F 30-4790 (4780) |

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IM22/1130

EXAMINER

BROWN, C

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

1765

DATE MAILED:

11/30/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/357,264

Applicant(s)
Zhang et al.

Examiner
Charlotte A. Brown

Group Art Unit
1765



☒ Responsive to communication(s) filed on Jul 19, 1999

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-18 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-18 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 2 and 3

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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DETAILED ACTION

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-2 and 12-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Indira et al. "Chemical Polishing of Metals : A Study" pp 80-91.

Indira discloses a chemical polishing solution for stainless steel. The solution contains 4ml of nitric acid (HNO_3) which is an oxidizing reactant, 23ml of sulfuric acid (H_2SO_4) which can be used as a co-reactant, and 7ml of hydrochloric acid (HCl) which can be used as an additive.

Although Indira does not disclose a method for chemical mechanical planarization of a Cu/Ta/TaN surface, he discloses a method for planarization of stainless steel and it is the Examiner's position that a person having ordinary skill in the art would have found it obvious to modify Indira by using the composition to planarize a Cu/Ta/TaN surface because the surfaces are metal surfaces and same would have been anticipated in order to produce an expected result.

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman et al (US 6,063,306).

Kaufman discloses a method for using a CMP slurry to polish a substrate including a copper or copper alloy containing substrate. The copper and copper alloy substrates comprise

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layers of pure copper, copper aluminum alloys, and Ti/TiN/Cu and Ta/TaN/Cu multi-layer substrates. The pH of the slurry is adjusted using an acid that contains no metal ions, such as ammonium hydroxide.

4. Claims 4-7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grossman et al. "A New Etchant for Thin Films of Tantalum and Tantalum Compounds", Vol 116, No.5, pp.674.

Indira discloses an etchant for tantalum and tantalum compounds. The solution is made up of 30% of sodium hydroxide and 30-35% of hydrogen peroxide. A substrate is etched in the mixture. Fresh reactants are used for each substrate. This reads on the applicant's limitation in which a an etching solution consists of a species selected from a group comprising hydrogen peroxide (H_2O_2).

Although Indira does not disclose a method for planarization of a Cu/Ta/TaN surface, he does disclose a method in which tantalum and tantalum compounds are etched, and is the Examiner's position that a person having ordinary skill in the art would have found it obvious to modify Indira in order to planarize a Cu/Ta/TaN surface and same would have been anticipated in order to produce an expected result.

5. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Indira et al. "Chemical Polishing of Metals : A Study", pp.80-91.

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Indira discloses typical solution compositions and operation conditions for chemcially polishing aluminum. One composition is composed of 75-87% of phosphoric acid, 2-25% of nitric acid 0.05-0.3% of a polyamine. The rest of the solution is water.

Unlike the claimed invention Indira does not disclose an etching solution comprising triethanolamine in an aqueous solution, but he does disclose that a solution comprises polyamine in an aqueous solution, and it is the Examiner's position that a person having ordinary skill in the art would have found it obvious to modify Indira therein because Indira is not particular about the type of amine used in his process and therefore any polyamine would have been anticipated in order to produce an expected result.

6. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Allman (US 5,645,736).

Allman discloses a method for polishing a workpiece such as a semiconductor wafer. A polishing composition is provided that has a a polishing media particle and a film forming binder. The polishing media particle is a silica particle. Precipitated silcia is made by reacting an alkaline silicate solution with a mineral acid, such as sulfuric acid.

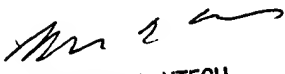
It is the Examiner's position that a person having ordinary skill in the art would have found it obvious to modify Allman by using the composition disclosed to planarize a Cu/Ta/TaN surface because Allman is not particular about the surface of workpieces and therefore any surface would ahve been anticipated in order to produce an expected result.

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7. Ant inquiry concerning this communication from the Examiner should be directed to Charlotte A. Brown whose telephone number is (703) 305-0727.

CAB

November 27, 2000


BENJAMIN L. UTECH
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TECHNOLOGY CENTER 1700